DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/19/09 has been entered.

2. This office action is in response to correspondence filed 10/19/09 regarding application 10/554010, in which claims 1 and 8 were amended. Claims 1-10 and 13 are pending in the application and have been considered.

Response to Arguments

3. The arguments on pages 6-12 of the Remarks have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3, 5, 6, 8, 9, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scheirer et al. (6,570,991) in view of Gray et al. ("Design of Moving Average Trend Filters using Fidelity, Smoothness and Minimum Revisions Criteria". Statistical Research Report Series No. RR96/01, Institute of Statistics and Operations Research, Victoria University of Wellington, New Zealand, 1997).

Consider claim 1, Scheirer discloses a method for classifying at least one audio signal into at least one audio class **(Title)**, the method comprising the steps of:

analyzing said audio signal to extract at least one predetermined audio feature **(Fig 1,** feature detector 12**)**;

performing a frequency analysis on a set of values of said extracted predetermined audio feature at different time instances resulting in a power spectrum of said extracted predetermined audio feature **(Fig 2,** different frames, **Fig 7c,** power spectrum, **Col 7 lines 53-54,** calculating the energy spectrogram**)**;

deriving at least one further audio feature representing a temporal behavior of said extracted predetermined audio feature **(Col 7 lines 47-48,** syllables per second**)** by parameterizing said power spectrum **(Col 7-8 lines 65-2,** normalized speech modulation energy**)**, wherein parameterizing said power spectrum comprises (a) summarizing a frequency axis of the power spectrum by summing energy within at least one predetermined frequency band **(Col 7 lines 59-60,** energy within each of the twenty channels of equal width represents the sum of energy at each frequency within the band**)** and (b) dividing (b)(i) the summed energy within the at least one predetermined

frequency band by (b)(ii) an average of values of said extracted predetermined audio feature **(Col 7 lines 65-67,** dividing by the frame energy signal**)** to (c) yield a relative modulation depth representing an amount of envelope modulation in the at least one predetermined frequency band **(Fig 12a, 12b)**; and

classifying said audio signal based on said further audio feature **(Fig 1,** classifier 16**)**.

Scheirer does not specifically mention an average of *subsequent* values.

Gray discloses an average of subsequent values **(p1, Abstract,** a central moving average filter divides the present value by preceding and subsequent values**).**

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Scheirer to include an average of subsequent values by using a central moving average filter as the moving average filter, in order to determine the trend at the point of greatest precision, as suggested by Gray **(p10).**

Claim 8 is directed to a system for performing the method of claim 1, and so is rejected for similar reasons.

Consider claim 9, Scheirer discloses a music system comprising:

means for playing audio data from a medium **(Col 1 lines 38-40)**; and

a system as named in claim 8 for classifying audio data **(See claim 8).**

Consider claim 2, Scheirer discloses at least one predetermined audio feature that comprises at least one of the following audio features:

spectral centroid **(Fig 3)**;

zero-crossing rate **(Fig 5)**;

spectral roll-off frequency **(Fig 6)**.

Consider claim 3, Scheirer implies, or at least suggests at least one mel-frequency cepstral coefficient **(Col 7 lines 55-56)**.

Consider claim 5, Scheirer discloses:

calculating an average value of said set of values of said extracted predetermined audio feature at different time instances **(Col 7 lines 63-65)**;

defining at least one frequency band **(Col 7 lines 54-55)**;

calculating the amount of energy within said frequency band from said frequency analysis **(Col 7 lines 60-65)**; and

defining said further audio feature as said amount of energy divided by said average value **(Col 7 lines 60-65)**.

Consider claim 6, Scheirer discloses at least one of the following modulation frequency bands are used in said parameterizing said power spectrum:

1-2Hz

3-15Hz **(Col 7 lines 26-50 and lines 59-61)**

20-150Hz.

Consider claim 13, Scheirer implies, or at least suggests performing a frequency analysis on a set of values of said extracted predetermined audio feature at difference time instances results in a log power spectrum of said extracted predetermined audio feature **(Fig 7)**.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scheirer et al. (6,570,991) in view of Gray et al. ("Design of Moving Average Trend Filters using Fidelity, Smoothness and Minimum Revisions Criteria". Statistical Research Report Series No. RR96/01, Institute of Statistics and Operations Research, Victoria University of Wellington, New Zealand, 1997), in further view of Blum et al. (5,918,223).

Consider claim 4, Scheirer and Gray do not specifically mention said predetermined audio feature comprises at least one of the psycho-acoustic audio features loudness and sharpness.

Blum discloses audio feature comprises at least one of the psycho-acoustic audio features loudness and sharpness **(Col 6 lines 45-47,** brightness**)**.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Scheirer and Gray such that said predetermined audio feature comprises sharpness in order to see some of the essential characteristics

of the sounds, as suggested by Blum **(Col 6 lines 50-52)**, making the classification more accurate.

7. Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scheirer et al. (6,570,991) in view of Gray et al. ("Design of Moving Average Trend Filters using Fidelity, Smoothness and Minimum Revisions Criteria". Statistical Research Report Series No. RR96/01, Institute of Statistics and Operations Research, Victoria University of Wellington, New Zealand, 1997), in further view of Rui et al. (7,028,325).

Consider claim 7, Scheirer and Gray do not, but Rui discloses at least one further audio feature is defined as at least one coefficient obtained by performing a discrete cosine transformation on the result of a frequency analysis **(Col 8 lines 33-34)**.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Scheirer and Gray such that at least one further audio feature is defined as at least one coefficient obtained by performing a discrete cosine transformation on the result of said frequency analysis, in order to calculate the MFCCs, as suggested by Rui **(Col 8 lines 29-36),** which more accurately reflect human hearing by having coarser resolution at high frequencies, thereby making them a better feature for classification of speech and music.

Consider claim 10, Scheirer and Gray disclose a multi-media system **(Scheirer,**

Col 1 lines 22-25) comprising:

means for playing audio data from a medium **(Scheirer, Col 1 lines 22-25)**;

a system as claimed in claim 8 for classifying said audio data **(See claim 8)**.

Scheirer and Gray do not specifically mention means for displaying video from a further medium; means for analyzing said video data; and means for combining the results obtained from analyzing said video data with the results obtained from classifying said audio data.

Rui discloses means for displaying video data from a further medium **(Fig 2)**; means for analyzing said video data; and means for combining the results obtained from analyzing said video data with the results obtained from classifying said audio data **(Fig 3)**.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Scheirer and Gray to include means for displaying video from a further medium; means for analyzing said video data; and means for combining the results obtained from analyzing said video data with the results obtained from classifying said audio data, in order to allow people to be entertained, as suggested by Rui **(Col 1 lines 20-23).**

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Allegro et al. "Automatic Sound Classification Inspired by Auditory Scene Analysis". in Proc. Eur. Conf. Sig. Proc. (EURASIP), 2001. disclose feature extraction for automatic classification of music/speech/noise

b. Dau et al. "Modeling Auditory Processing of Amplitude Modulation. I. Detection and Masking with Narrow-band Carriers". J. Acoust. Soc. Am. 102 (5), Pt. 1, Nov 1997, disclose modulation recognition using a temporal modulation transfer function

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse Pullias whose telephone number is 571/270-5135. The examiner can normally be reached on M-F 9:00 AM - 4:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Hudspeth can be reached on 571/272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571/270-6135.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Jesse S Pullias/
Examiner, Art Unit 2626

/Talivaldis Ivars Smits/
Primary Examiner, Art Unit 2626

1/6/2010